U.S. DEPARTMENT OF ENERGY

# Center for Materials Science of Nuclear Fuel
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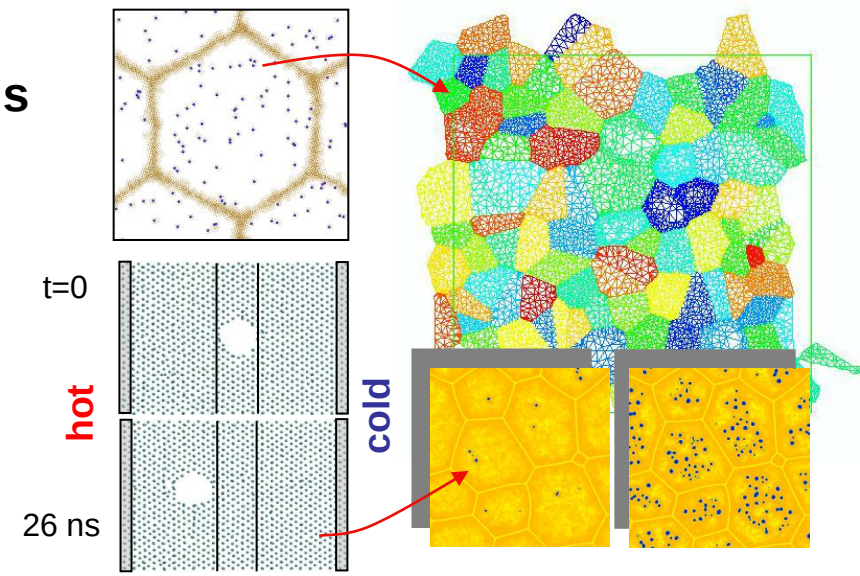
**Summary:** The central theme of the Center is ***'Microstructure Science under Irradiation'***, i.e., the determination of how concurrent microstructure formation and evolution under irradiation control the thermo-mechanical behavior of $UO_2$ as a model nuclear-fuel material.




## RESEARCH PLAN AND DIRECTIONS

Develop an ***experimentally validated, multi-scale modeling approach*** for micro-structure evolution under irradiation (void-, fission-gas and phase behavior, stress development, ...) and predict how these affect, e.g., thermal transport. Incorporation of microstructural processes based on atomic-level mechanisms is critical towards developing a ***predictive*** fuels-performance capability.

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